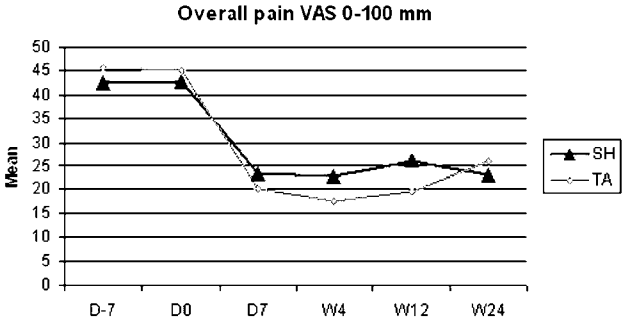
## P144

### EFFICACY AND SAFETY OF SODIUM HYALURONATE IN THE TREATMENT OF OSTEOARTHRITIS OF THE CARPOMETACARPAL JOINT OF THE THUMB VERSUS CORTICOSTEROID

P Bruehlmann, D Frey, B Salzmann, A Koch, BA Michel
*Department of Rheumatology and Institute of Physical Medicine, University Hospital, Zurich, Switzerland*

**Aim of Study:** To assess whether one intra-articular (i.a.) injection of sodium hyaluronate (SH) 1.0% would reduce pain and improve function over 6 months in patients with rhizarthrosis compared to corticosteroid.
**Methods:** This pilot, randomised, masked-observer, controlled study involved patients with symptomatic osteoarthritis of the carpometacarpal joint of thumb. Pain on rotatory movement was required to be >30 mm on 100 mm Visual Analogue Scale (VAS). After an analgesic washout period, patients received a single i.a. injection of either SH 10 mg/1 ml (Ostenil® mini, TRB Chemedica AG, Germany) or triamcinolone acetonide (TA) 10 mg/1 ml. Patients were observed over 6 months with visits at Day 7, Week 4, 12, 24. Paracetamol was available as rescue analgesia. Three dimensions of pain were assessed as efficacy parameters and measured on VAS: overall pain of thumb/on rotatory movement/on joint shifting. Other parameters included VAS pain on pinch (tip, key, palmar), physician's assessment of disease activity (VAS) and Dreiser Algofunctional Index (0-30).
**Results:** 69 patients (mean age 63 years, 53 women) were randomised; 62 completed the study. Seven failed to complete due to adverse events (2), short efficacy duration (2), lack of efficacy (1), lost to follow up (1) and consent withdrawal (1). The 69 patients (SH=34, TA=35) were analysed as ITT. Mean overall pain values in SH group decreased significantly from 42.7 mm at baseline before injection to 22.9 mm at Week 24 ($p<0.001$) and in TA group from 45.2 mm to 26.2 mm ($p<0.01$). No significant intergroup difference was found.




Similar results were found for pain on rotatory movement, pain on joint shifting, pain on pinch and disease activity.

*Mean VAS values (mm)*

| | SH | | TA | |
|---|---|---|---|---|
| | Baseline | Week 24 | Baseline | Week 24 |
| Overall pain | 42.7 ±20.5 | 22.9 ±19.8 | 45.2 ±19.2 | 26.2 ±22.3 |
| Pain on rotatory movement | 55.4 ±16.7 | 28.3 ±19.4 | 55.5 ±15.2 | 31.6 ±27.8 |
| Pain on joint shifting | 39.7 ±25.7 | 21.6 ±17.8 | 37.3 ±20.1 | 21.6 ±23.3 |
| Pain on tip pinch | 45.1 ±19.3 | 25.0 ±16.5 | 39.7 ±21.6 | 26.0 ±21.4 |
| Pain on key pinch | 37.6 ±24.8 | 19.9 ±18.3 | 39.5 ±25.1 | 24.4 ±22.3 |
| Pain on palmar pinch | 50.5 ±20.4 | 23.0 ±17.9 | 45.8 ±23.0 | 29.1 ±26.0 |
| Disease activity | 55.3 ±14.2 | 26.3 ±20.3 | 55.5 ±11.6 | 22.8 ±18.0 |

SH group exhibited a mean baseline Dreiser Index of 10.6 vs 9.5 in TA group (p=ns). It decreased in both groups to reach 7.8 in SH group vs 6.8 in TA group (p=ns). Two patients dropped out of the study because of adverse events in SH group (acute low back pain and tendopathy of right thumb).
**Conclusions:** A single injection of SH led to significant improvement in pain and function and was as effective as TA for treating rhizarthrosis. Sustained improvement was demonstrated in both groups at all time points over 6 months.

## P145

### CHONDROITIN SULFATE MAY HAVE DIFFERENTIAL EFFECTS ON OA SYMPTOMS RELATED TO DEGREE OF RADIOGRAPHIC INVOLVEMENT

DO Clegg, DJ Reda, MM Hooper, RW Moskowitz, the GAIT Investigators
*School of Medicine, University of Utah, Salt Lake City, UT*

The Glucosamine/chondroitin Arthritis Intervention Trial (GAIT) was a randomized double-blind placebo- and celecoxib-controlled trial of 1583 OA patients designed to evaluate the efficacy of glucosamine (G), chondroitin sulfate (CS), and combination (G+CS) in improving osteoarthritis (OA) knee pain. GAIT patients had symptomatic and radiographic (Kellgren and Lawrence (KL) Grades 2 or 3) OA. We report a subanalysis of GAIT results based on interaction of KL Grade and CS response relative to placebo.
As expected, baseline characteristics demonstrated that patients with KL3 radiographic disease were significantly older, more obese and had more severe OA in terms of disease duration, baseline WOMAC, patient global and quality-of-life measures. The following table details treatment outcomes by KL Grade. Interactions between treatment group and KL Grade are signif-

*Abstract P145 – Table 1*

| Outcome Measure | KL | Chondroitin Sulfate n=318 | Placebo n=313 | P values | | |
|---|---|---|---|---|---|---|
| | | | | KL Grade 2 vs 3 | CS vs Placebo | Treatment group by by KL Grade interaction |
| Percent treatment responders | | | | | | |
| Primary (WOMAC 20) | 2 | 72.6% | 63.1% | 0.0016 | 0.1046 | 0.1668 |
| | 3 | 55.3% | 56% | | | |
| OMERACT-OARSI | 2 | 71.0% | 59.8% | 0.0015 | 0.0721 | 0.1345 |
| | 3 | 53% | 53% | | | |
| Change in WOMAC Subscales | | | | | | |
| Pain | 2 | -101.5 | -90.3 | 0.0042 | 0.0907 | 0.0753 |
| | 3 | -59.5 | -80.4 | | | |
| Stiffness | 2 | -40.7 | -37 | 0.0049 | 0.0271 | 0.0120 |
| | 3 | -18.1 | -35.7 | | | |
| Function | 2 | -289.6 | -218.6 | 0.0617 | 0.0100 | 0.0101 |
| | 3 | -160.3 | -239.2 | | | |
| Change in Swelling | 2 | 10.6 | 16.7 | 0.0508 | 0.0138 | |
| | 3 | 15.0 | 24.2 | | | |

icant for WOMAC Stiffness and Function while WOMAC Pain shows a trend, indicating better response for CS relative to placebo for KL2 compared with KL3. Treatment responder analyses show trends for interaction, indicating potential advantage of CS over placebo for KL2 compared with no difference between CS and placebo for KL3. Joint swelling shows no interaction but a significant treatment difference, indicating an advantage of CS over placebo independent of KL Grade. In general, CS response within the KL 2 group is very similar to that seen for celecoxib, in contrast to the KL 3 group where the response was more similar to, and in some instances, worse than placebo. Similar variations related to KL grade were not seen for the G or G+CS groups.
While little is known about potential biologic effects of dietary supplements, these results suggest that the extent of radiologic disease may be an important factor in response in symptomatic OA. These results suggest that CS may improve OA knee pain in patients with relatively early radiographic disease, a time when bone-related structural responses (osteophytes, subchondral sclerosis) are prominent and differential osteoblast cytokine/PGE2 interactions have been noted (*Osteoarthritis Cart*,10:491-500, 2002;and 7:321-2, 1999). Similar differential structure-pain responses have been reported with intraarticular hyaluronans (*Clin Exp Rheumatol*, 3:307-11, 2003). Additional research will help explain differential responses in the KL grade subgroups.

## P146

### MEASUREMENT OF KNEE JOINT IMPACT DURING GAIT WITH THREE-DIMENSIONAL LINEAR ACCELERATIONS: REPRODUCIBILITY ON A MEDIAL KNEE OSTEOARTHRITIS POPULATION

K Turcot[1], R Aissaoui[1,2], M Pelletier[3], N Hagemeister[1,2], G Parent[1], JA de Guise[1,2]
*[1]Laboratoire de Recherche en Imagerie et Orthopedie, Centre de Recherche du CHUM, Hopital Notre-Dame, Montreal, QC, Canada; [2]Genie de la Production Automatisee, Ecole de Technologie Superieure, Montreal, QC, Canada; [3]Physiatrie, Hopital Notre-Dame, CHUM, Montreal, QC, Canada*

**Aim:** Many studies had shown the potential of accelerometric sensors to estimate the transmission of shock loading through the skeleton during functional activities. Knowing that knee osteoarthritis is an important degenerative pathology affecting joint absorption, a method that estimate knee joint impact using three-dimensional (3D) linear accelerations was developed. Reproducibility of the proposed method is presented here on a knee osteoarthritis population.
**Methods:** 20 subjects with medial knee osteoarthritis (confirmed by X-Rays) were included in this study (62.7 $\pm$ 7.4 years). Linear accelerations were estimated at both proximal-tibial and distal-femoral local coordinate segment origins. Biomechanical evaluation consisted in a treadmill walking gait evaluation at self-determined speed. Data were collected during a 25 seconds trial. VICON motion analysis system was used to track the position and the orientation of the lower limb segment in 3D space. Knee joint coordinate system was defined using a functional postural calibration method. Two triaxial gyroscopes and two triaxial accelerometers were fixed at the thigh and shank levels to measure angular velocity and linear accelerations of each segment in medial lateral (ML), anterior posterior (AP) and proximal distal (PD) directions. Motion sensors, accelerometers and gyroscopes were all rigidly fixed on an exoskeleton to minimize skin-mounted sensor vibration. Data were collected at a frequency of 120 Hz. In order to establish the reproducibility of the measurement, all subjects participated in two evaluation sessions separated by 6 to 8 days. Both evaluations were compared during heel contact and toe-off gait cycle phases instants. Altogether, 36 values were computed (maximum, minimum and range values of linear accelerations for each instant and each segment) and statistically compared with a Student t-test to insure that no significant difference ($p > 0.05$) exist between measurement session.
**Results:** Data showed good reproducibility with no significant difference for 33 of the 36 values tested. However, a significant difference was found for the maximal AP acceleration value of the femur at heel contact ($p < 0.02$) and on both the minimal PD linear acceleration of the tibia ($p < 0.03$) and its range ($p < 0.005$) at the instant of toe-off.
**Conclusion:** Linear accelerations found in this study showed consistent results between session evaluations. Hence, femoral and tibial linear accelerations will be useful to assess knee joint impact in a follow-up osteoarthritis population. Preliminary results from patients that have sustained a rehabilitation treatment in physiotherapy show a decrease in linear acceleration magnitude. These findings could indicate the capacity of patients to reduce their impact loading during walking gait after the rehabilitation treatment.

## P147

### FUNCTIONAL ABILITIES OF PERSONS WITH AND WITHOUT KNEE OA IN ESTONIAN 34-54 YEAR POPULATION: ELVA STUDY

AO Tamm[1], AE Tamm[2], K Veske[3], Y Hansen[4]
*[1]Laboratory Medicine, University of Tartu, Tartu, Estonia; [2]Sports Medicine and Rehabilitation, University of Tartu, Tartu, Estonia; [3]Department of Radiology, Tartu University Clinics, Tartu, Estonia; [4]YH Family Practice, YH Family Practice, Elva, Tartu County, Estonia*

Symptoms, signs, functional limitations and radiographic alterations are characteristic features of advanced knee OA in older population. There is a gap in our knowledge which are the first limitations of functional capacities in younger persons with early grades of knee OA (KOA).
**Aim** was to study functional abilities of persons with and without KOA in popu-lation aged 34-54
**Subjects:** All 559 persons 0f age 34-54 from one family doctor (FD) register got postal questionnaire. 220 out of 348 (64%) of responders noted pain or other symp-toms or functional limitations. 162 subjects out of 220 (101 F; 61 M; mean age 45 years) agreed to undergo in-depth examination voluntarily.
**Methods:** Radiological KOA was diagnosed by weight-bearing AP radiographs tibio-femoral, TF, and prone radiographs for patello-femoral, PF, compartments. Subjects ability to use their knees was assessed by two new sub-scales of advanced WOMAC scale-KOOS (Roos, 1999) questionnaire: Activities of Daily Living (ADL) and Sport/Recreation (SP/REC) and (iii) by three functional tests-30 m maximal walking speed (30MWS) and stepping up test (SUT) separately with left/right leg and flexion-extension of the knees was measured using standard goniometry.
**Results:** *KOOS:* Grade I OA (both in TF and PF joint) was accompanied with decrease of score on Sport/Rec scale (p= 0.0006) in women but not in men. Women had also more pain (p=0.04), more limitations in ADL (p= 0.025) in case of grade I TF OA. In men grade II PF OA was associated with more symptoms (but no knee pain) comprised with grade 0 PF OA (p= 0.013)
*Tests:* The women with TF I OA were less able to bend their knee compared with the women without OA (left $r_s$ = - 0.410, p = 0.00001, right $r_s$ = - 0.239, p=0.02;). Women with PF II OA were less able to bend their knees than women without PF OA (p = 0,01). In SUT with right leg women with PF I OA and TF I OA had lower results in comparison with women without OA (p=0,047 and p=0,002). Women with PF I OA and TF I OA had slower walking speed in comparison with women without PF or TF OA accordingly p = 0,019 and p = 0,04 in 30MWS. Women with higher BMI